

# **GEOLOGICAL SURVEY OF ALABAMA GROUNDWATER ASSESSMENT PROGRAM: PROGRAM UPDATE AND CURRENT GROUNDWATER RESEARCH**

**Marlon Cook**



# Geological Survey of Alabama Groundwater Assessment Program

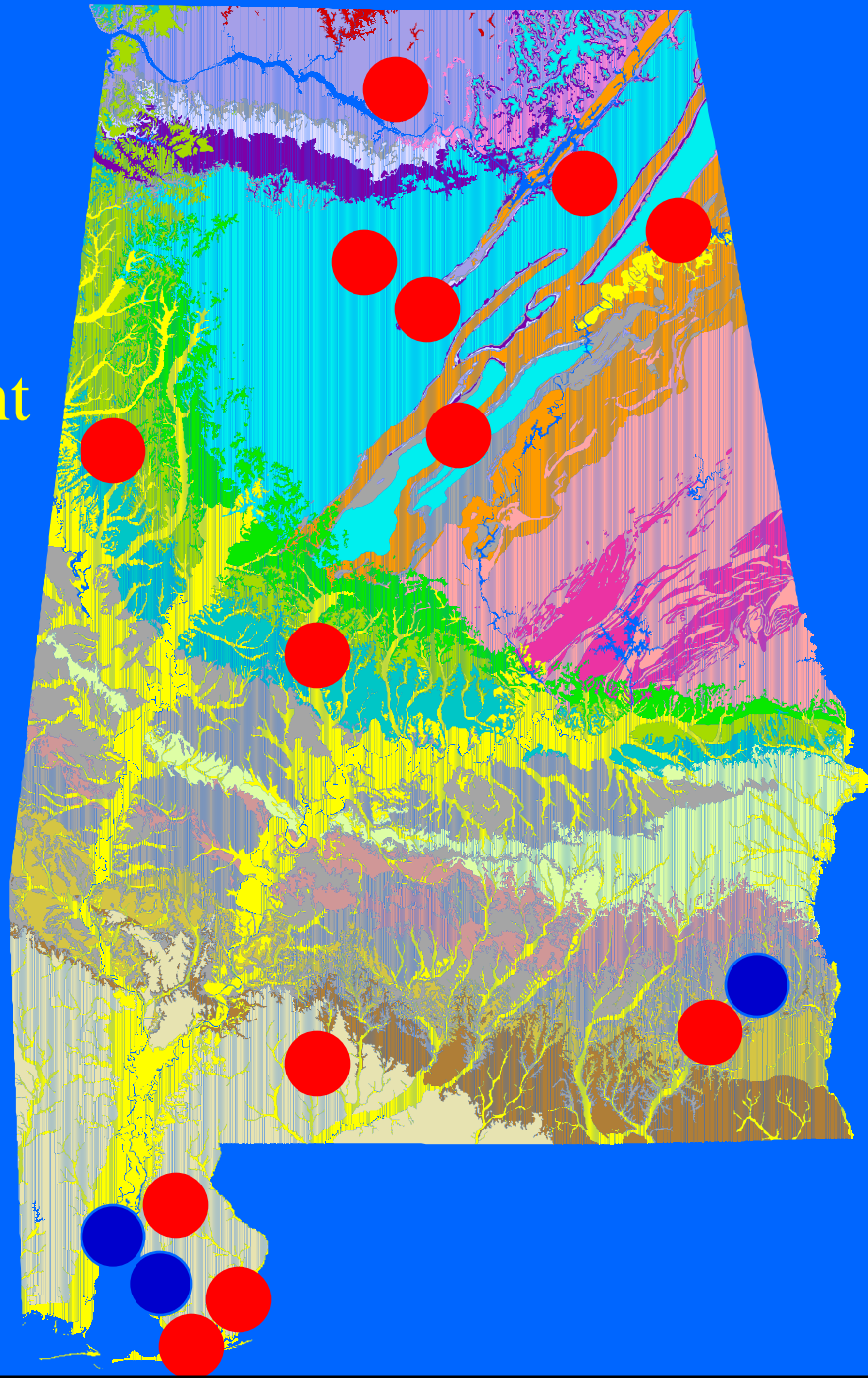
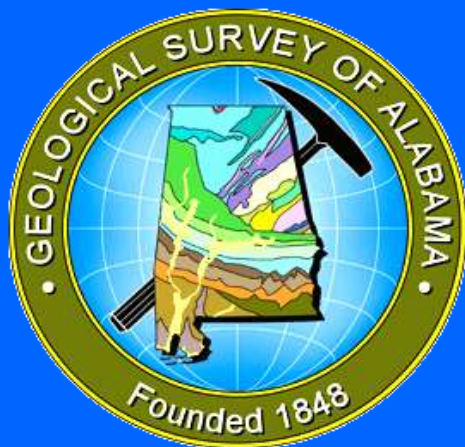
- Applied Research for Water Resource Development and Protection and Water Policy Development
  - Groundwater
  - Surface water
- Water Information Distribution
  - Response to requests for water resource information
  - Web-based information
  - Written reports
- Groundwater Monitoring
  - Annual manually monitored water levels
  - Continuously monitored water levels



- Applied Research for Water Resource Development and Protection and Water Policy Development
  - Groundwater
    - Water supply source exploration
    - Geochemical assessments
    - Recharge assessments
    - Groundwater/Surface-water interaction assessments
    - Groundwater production impacts
  - Surface water
    - Geochemical assessments
    - Sedimentation loading assessments



Current GSA  
Groundwater Assessment  
Program  
Research Projects

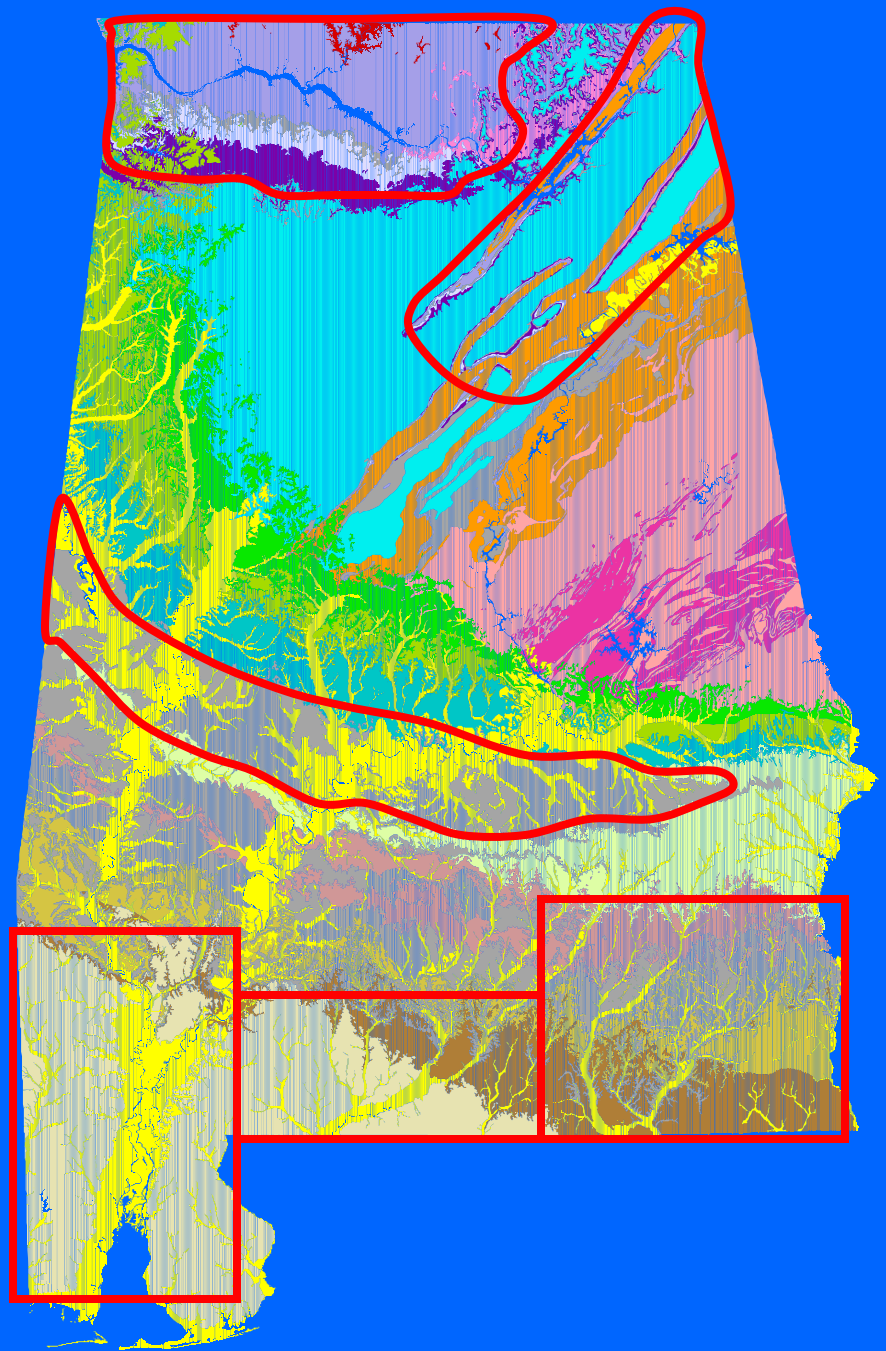
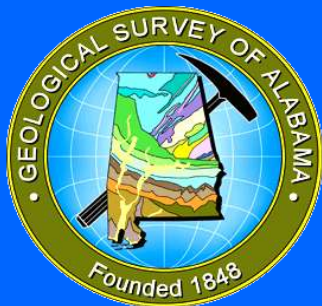


# Groundwater Research

- Alabama Irrigation Initiative
  - Determine the viability of large scale irrigation with water stored on the land surface.
  - GSAGAP role to determine if groundwater is a viable source of water for large scale irrigation.



# GSA Irrigation Research



N 34° E

N 37° E

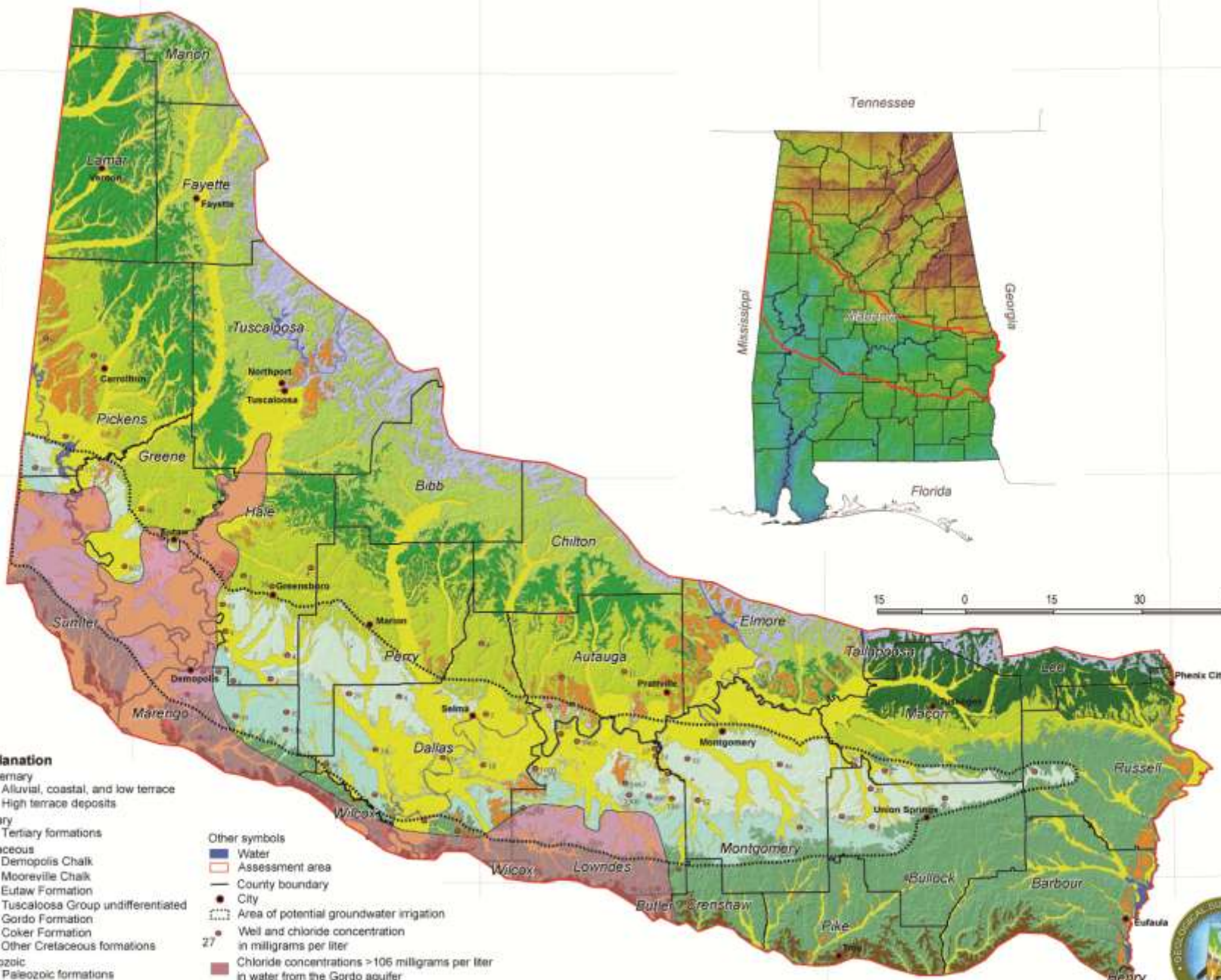
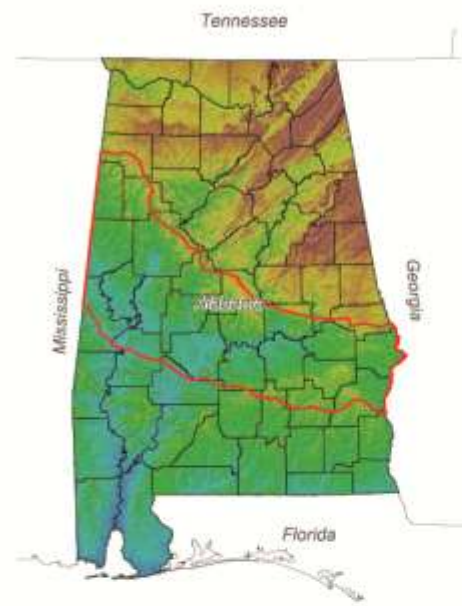
N 32° E



### Explanation

- Quaternary**
  - Alluvial, coastal, and low terrace
  - High terrace deposits
- Tertiary**
  - Tertiary formations
- Cretaceous**
  - Demopolis Chalk
  - Mooreville Chalk
  - Eutaw Formation
  - Tuscaloosa Group undifferentiated
  - Gordo Formation
  - Coker Formation
  - Other Cretaceous formations
- Paleozoic**
  - Paleozoic formations

- Other symbols**
  - Water
  - Assessment area
  - County boundary
  - City
  - Area of potential groundwater irrigation
  - Well and chloride concentration in milligrams per liter
  - Chloride concentrations > 106 milligrams per liter in water from the Gordo aquifer



**Chloride Concentrations in Water from Selected Wells  
Constructed in the Gordo Aquifer in the Black Belt Region of Alabama**

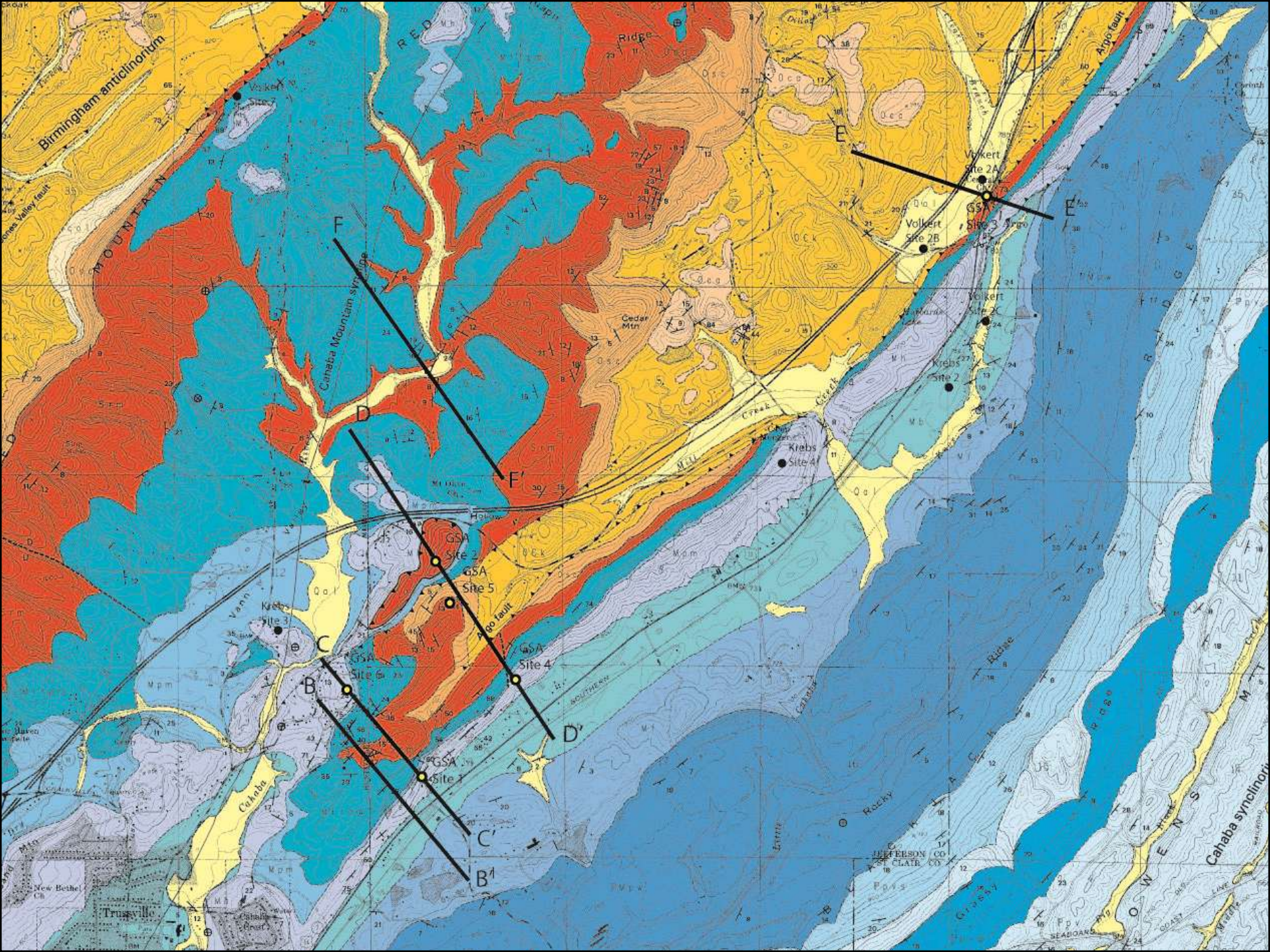
By  
Marlon R. Cook and Dorina Murgueta  
2009



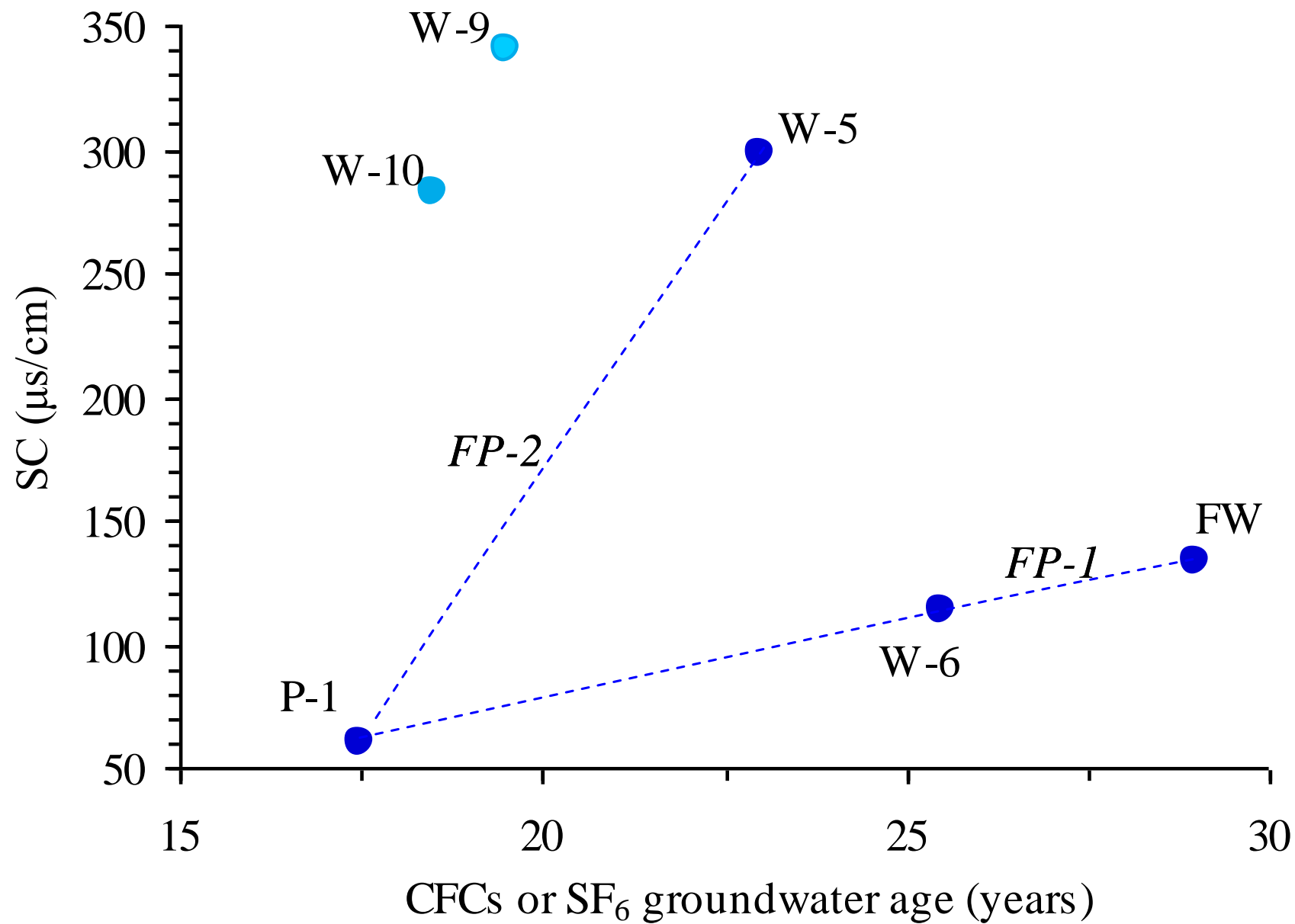
Berry H. (Nick) Trew, Jr.  
State Geologist

# Groundwater Research

- Trussville Water Source Development and Protection
  - Find additional sources of groundwater in the Trussville Utilities service area.
  - Assess sources and pathways of aquifer recharge.
  - Make recommendations for the future protection of groundwater sources in a growing urbanized area.







## – Water Information Distribution

- Response to requests for water resource information
  - The GAP responds to more than 300 requests for water resource information each year.
- Web-based information
  - Basic program information
  - Published and open-file reports
  - Well records
    - » More than 100,000 records
    - » 95% currently scanned and will soon be available on the GSAGAP website
  - Groundwater level data
    - » Manually monitored annual data
    - » Real time continuously monitored data





# Ground Water Assessment Program

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## Groundwater Assessment Program

**Marlon Cook, Director**

### Assessment Section

[Local Projects](#)  
[Regional and](#)  
[Statewide Projects](#)

### Information Distribution Section

[Continuous Monitoring wells](#)  
[Periodic Monitoring wells](#)  
[Scanned well records](#)

### Reports

[Bibliography of Water related reports](#)  
[On-line reports](#)  
[GSA Reports](#)  
[Open-file Reports](#)

### Geochemical Analyses Section

## Welcome

One of Alabama's great blessings is its abundant and high quality of its water resources. However, extreme droughts have brought into question our ability to effectively develop and protect these resources that are key components to sustaining economic growth and maintaining our quality of life. Alabama's groundwater and surface-water systems are hydrologically interconnected and function together to provide water for public, industrial, agricultural, and recreational use. Knowledge of these complex systems gained through scientific research is paramount to the protection and sustainability of this irreplaceable resource.

One of the most important responsibilities of the Geological Survey of Alabama is to perform research that increases our knowledge of the waters of the state. **The Groundwater Assessment Program (GAP)** investigates the occurrence, availability, and quality of the state's waters by employing hydrologic and geologic expertise. The GAP works in cooperation with other state and federal agencies, local governments and water systems, industry, educational institutions, and citizens to address Alabama's water issues. Knowledge gained from this research is available to the public through publications, open file reports, databases, web site, and through information requests directed to the Groundwater Assessment Program at the Geological Survey of Alabama.

## Our Program

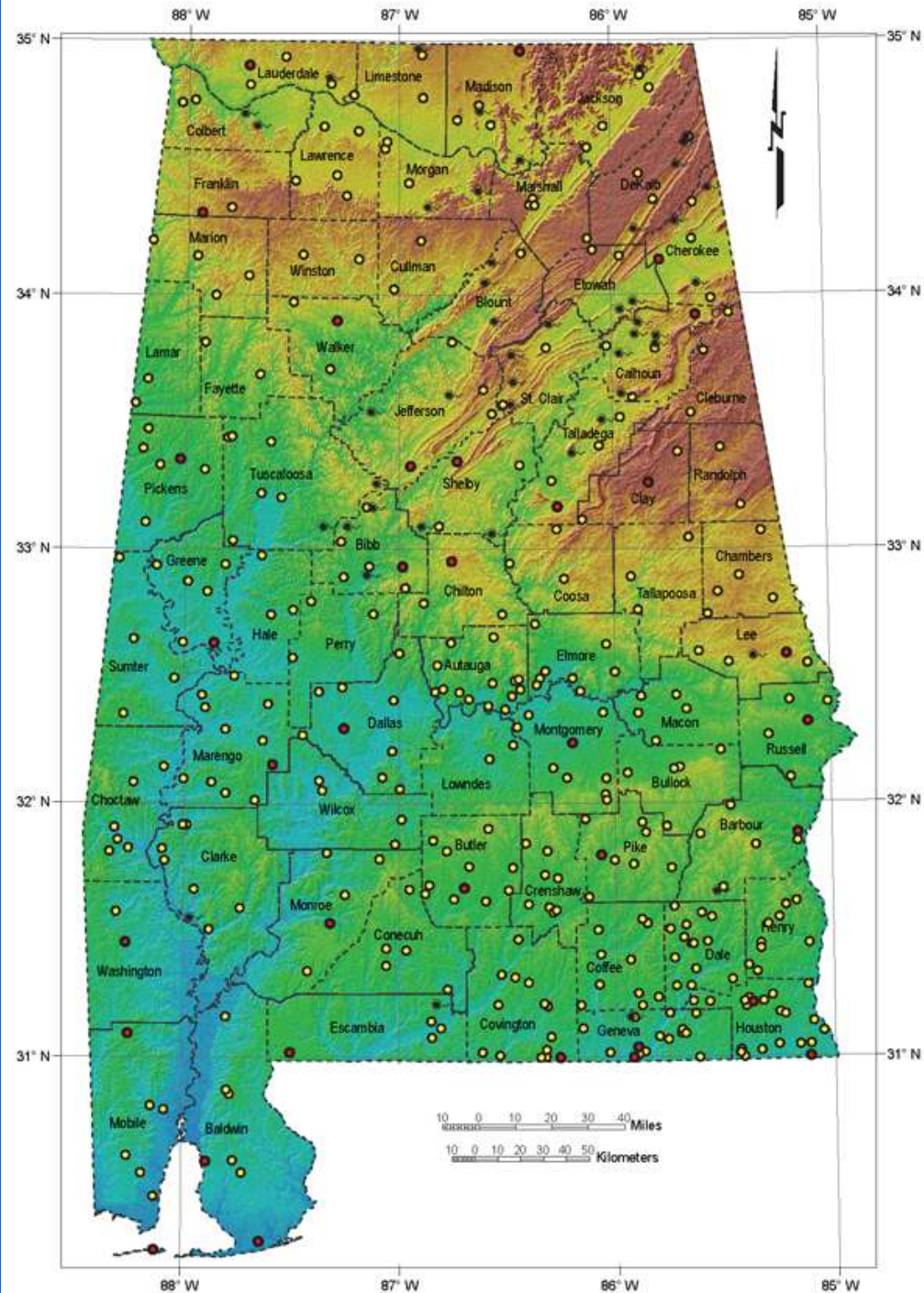
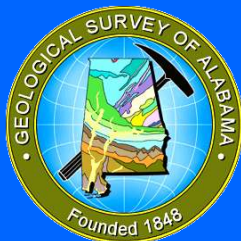
The Groundwater Assessment Program consists of three groups: Assessments, Information Distribution, and Geochemical Analyses, all located in Walter B. Jones Hall.

## – Groundwater monitoring

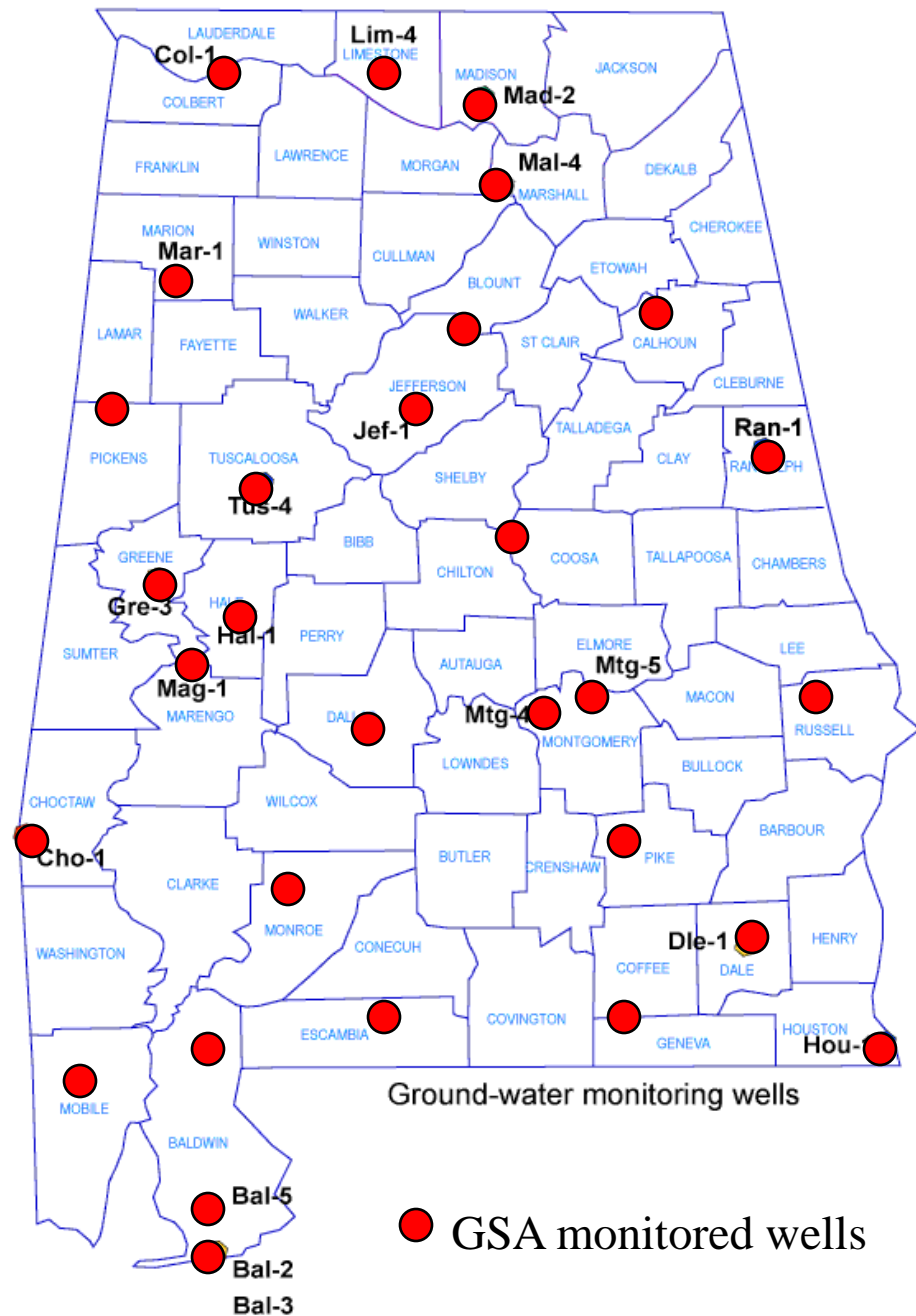
- Annual monitoring
  - 400 wells and springs
  - Water levels measured in October
  - Many wells have a 40-year record
- Real-time monitoring
  - 30 wells
  - Water levels will soon be available on GSAGAP website
  - Coastal wells will have water level and conductivity



# Semi-Annual/Annual Monitored Wells

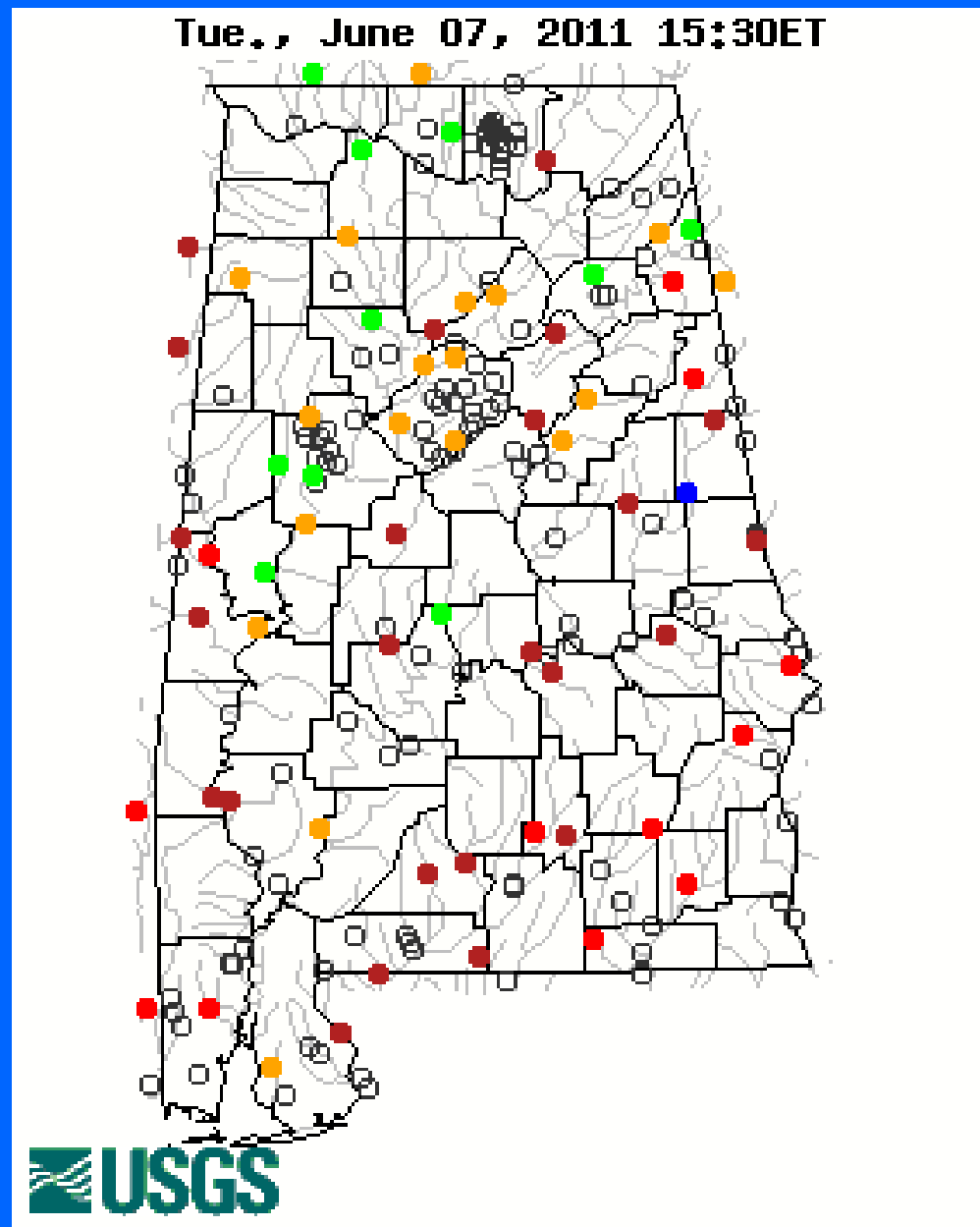


# Alabama Real Time Groundwater Level Monitoring System

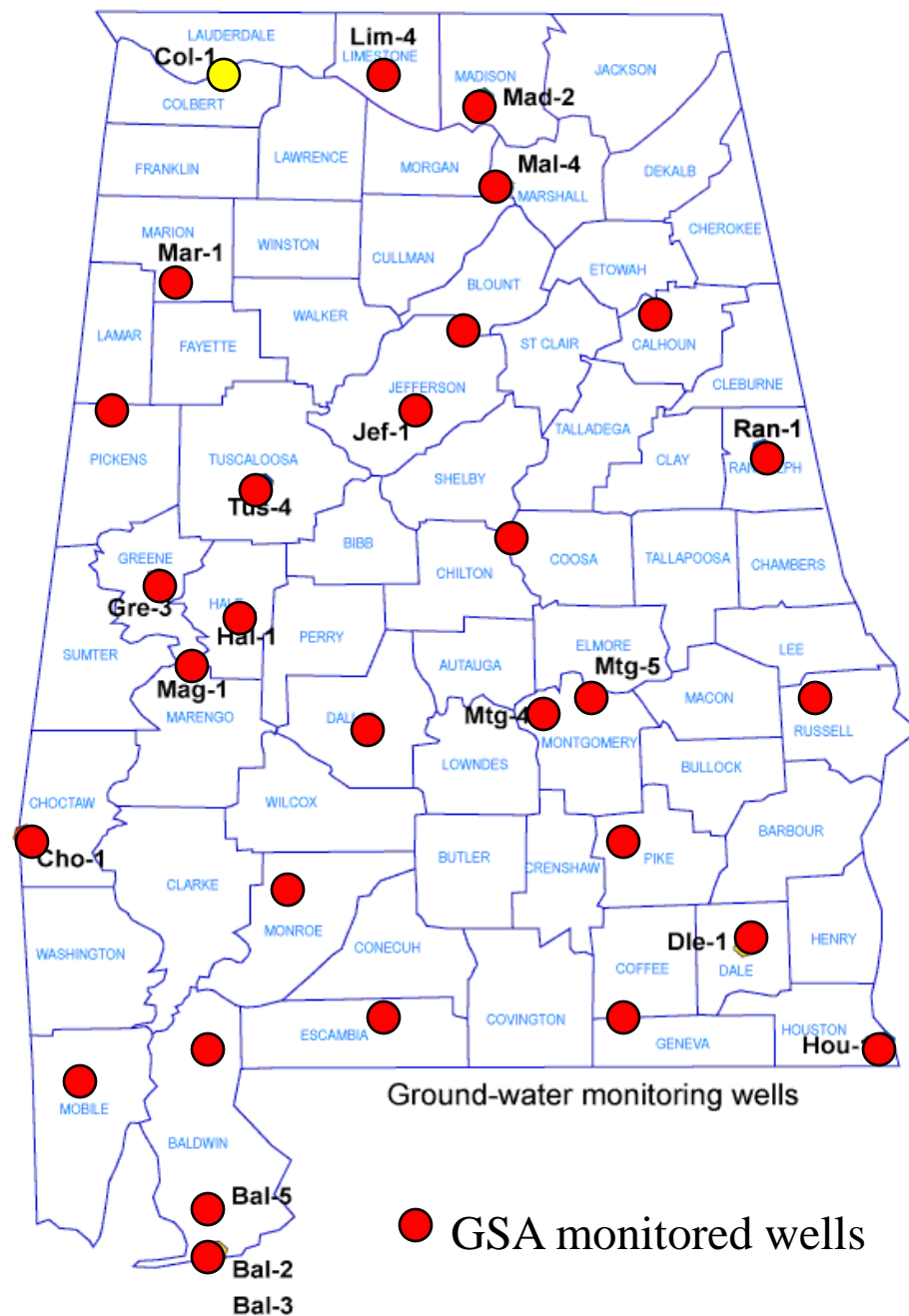


# Drought Impacts

## Surface-Water Levels



# Colbert County

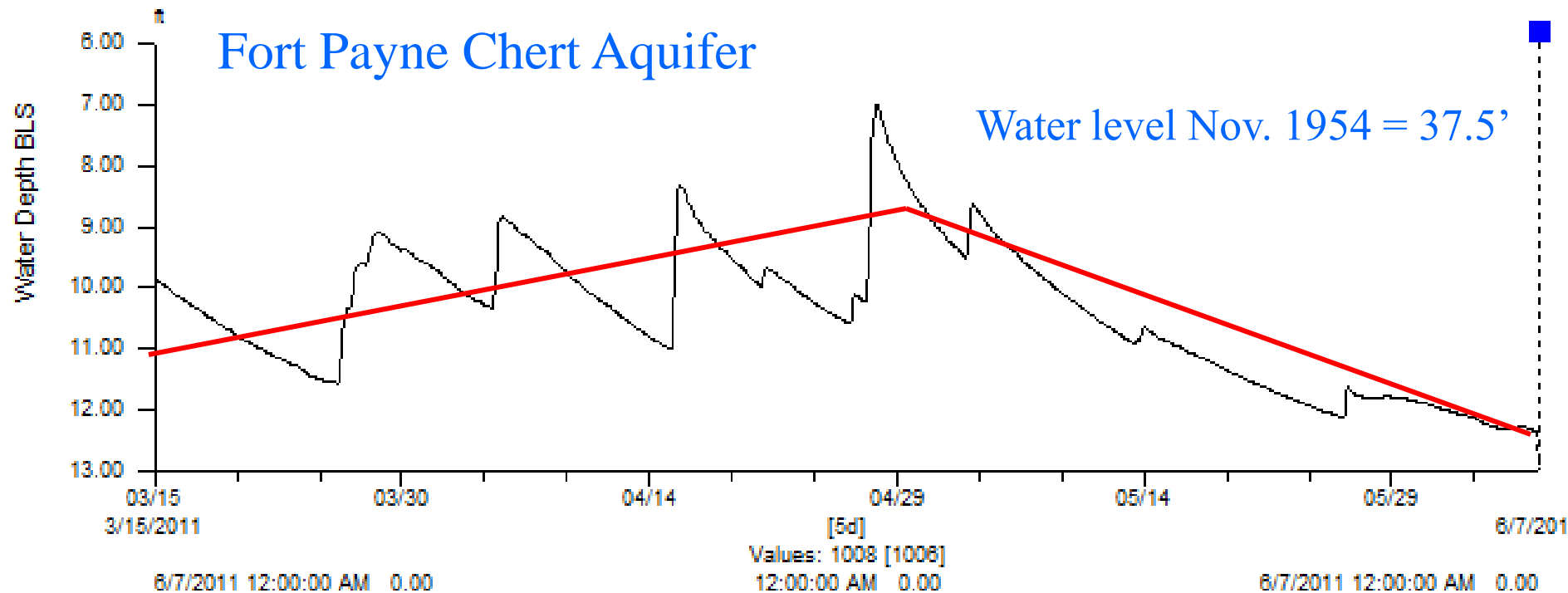


Region: » All Stations «  
Meas. values

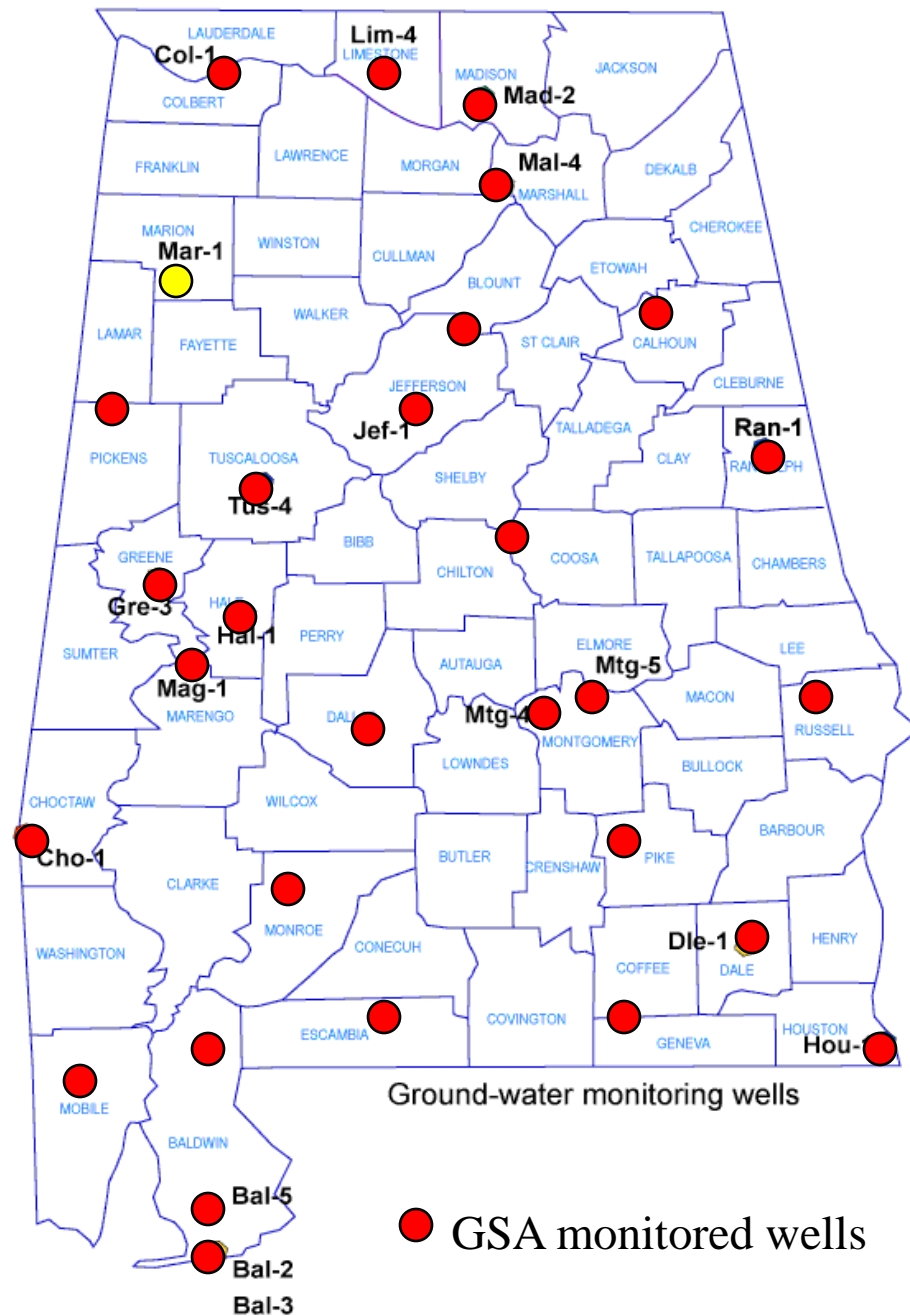
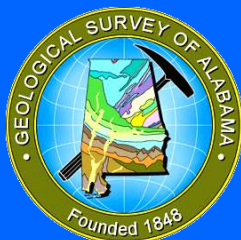
Station:  
Sensor:

COL 1  
Water Depth BLS

## Fort Payne Chert Aquifer



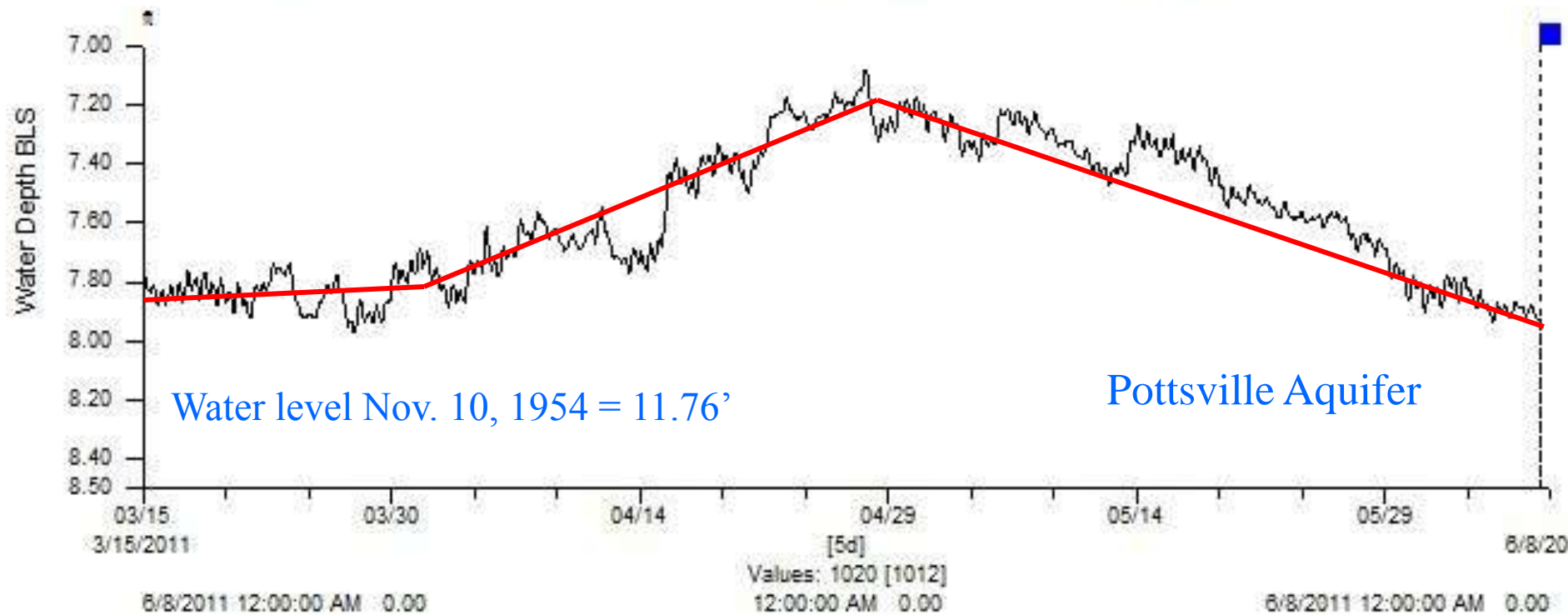
# Marion County



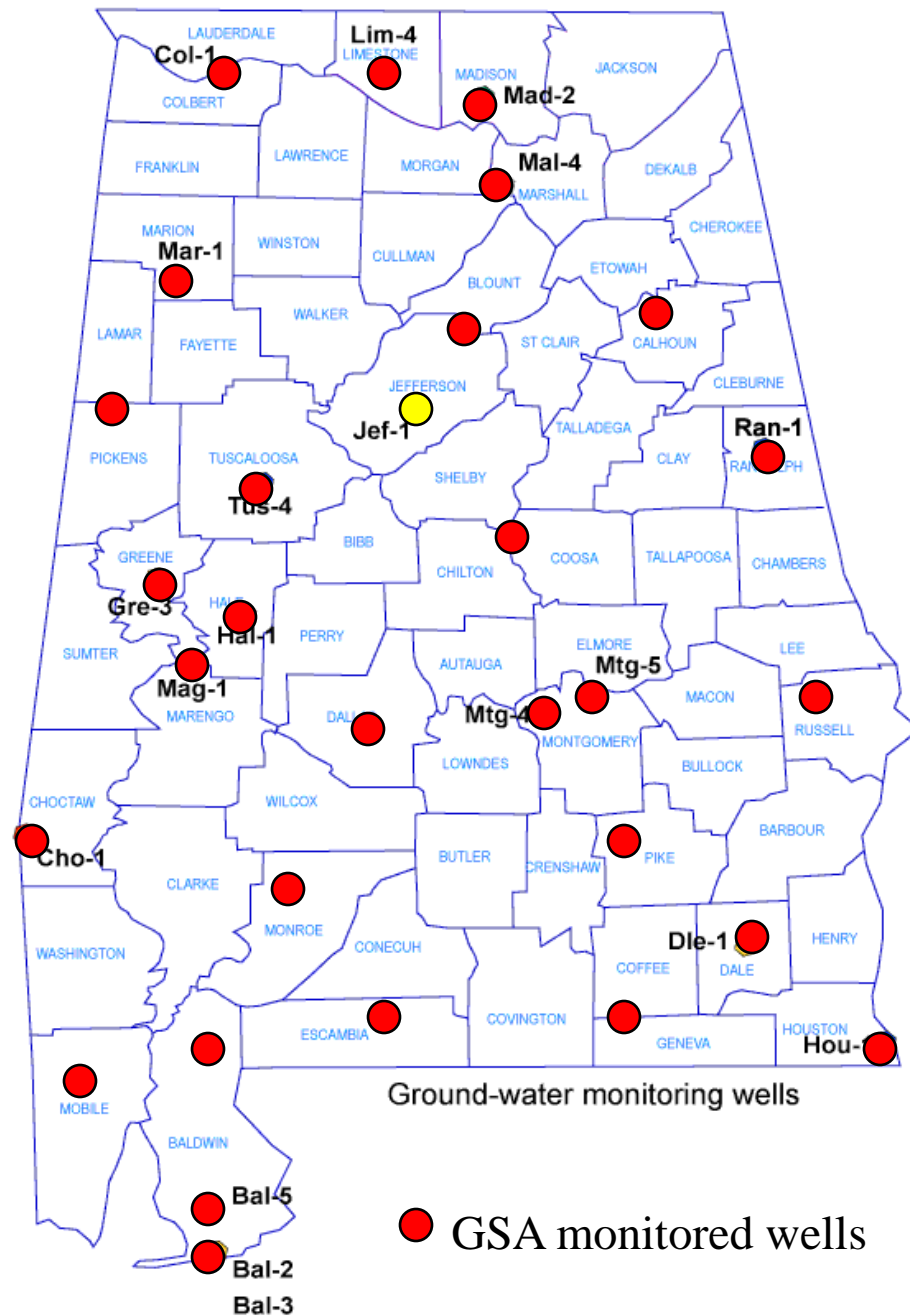
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Meas. values

Station:  
Sensor:

MAR 1  
Water Depth BLS



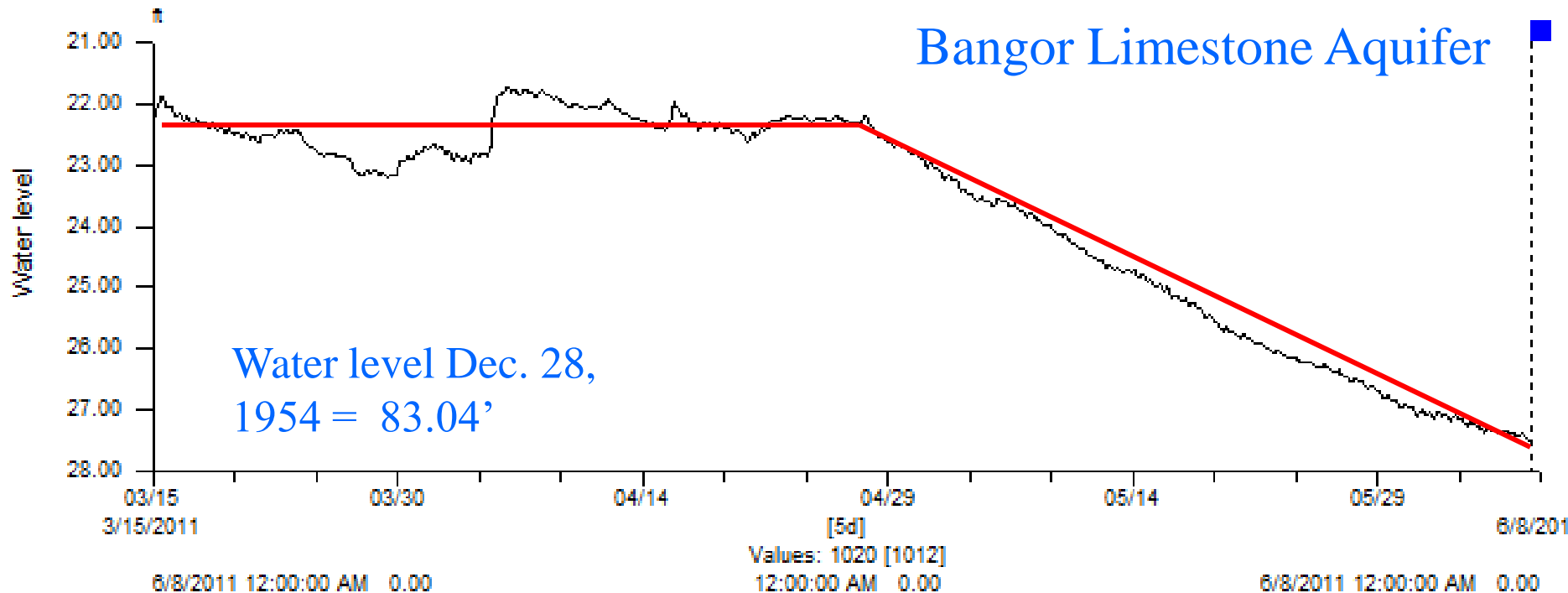
# Jefferson County



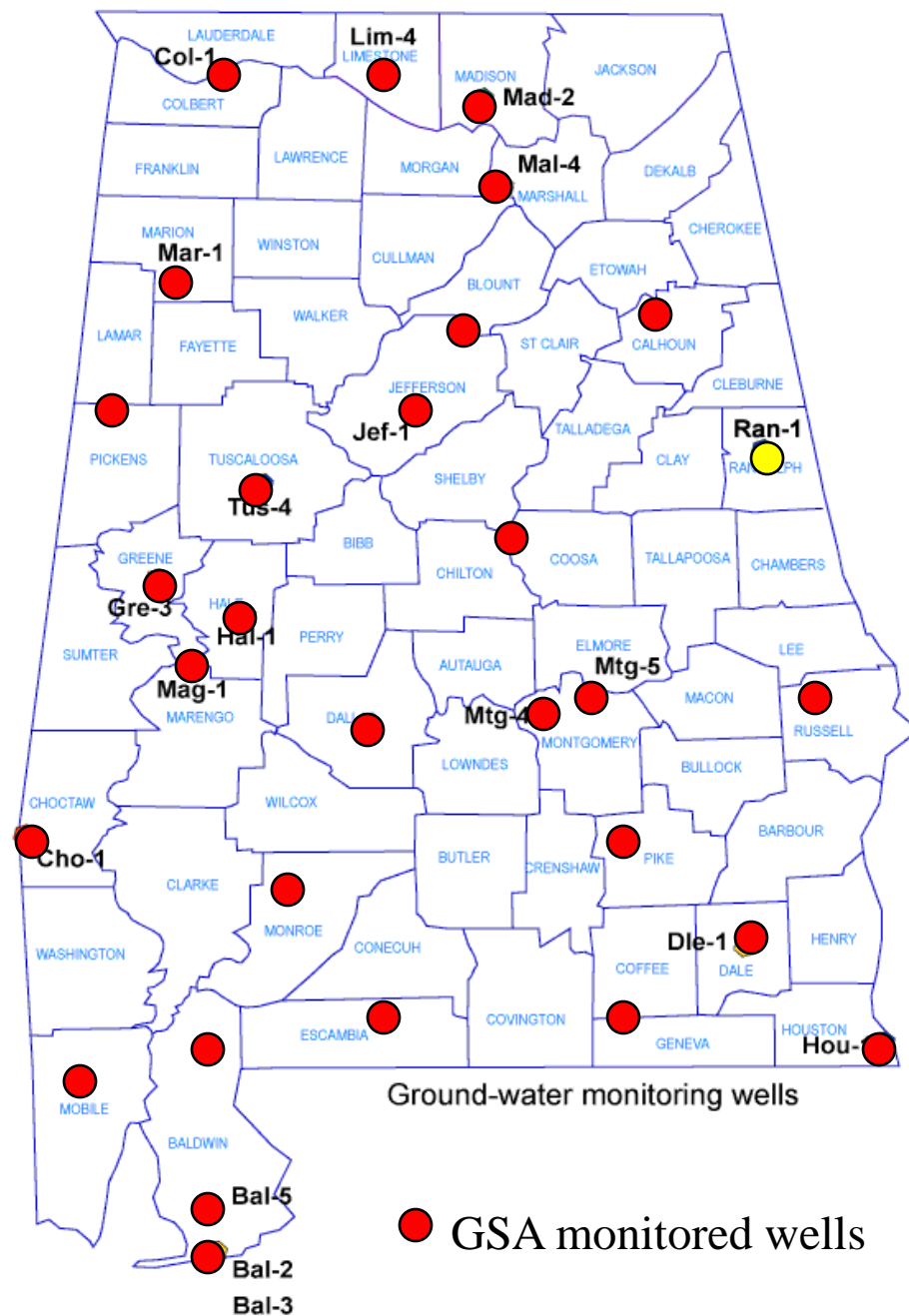
Region: » All Stations «  
Meas. values

Station:  
Sensor:

JEF1  
Water level



# Randolph County

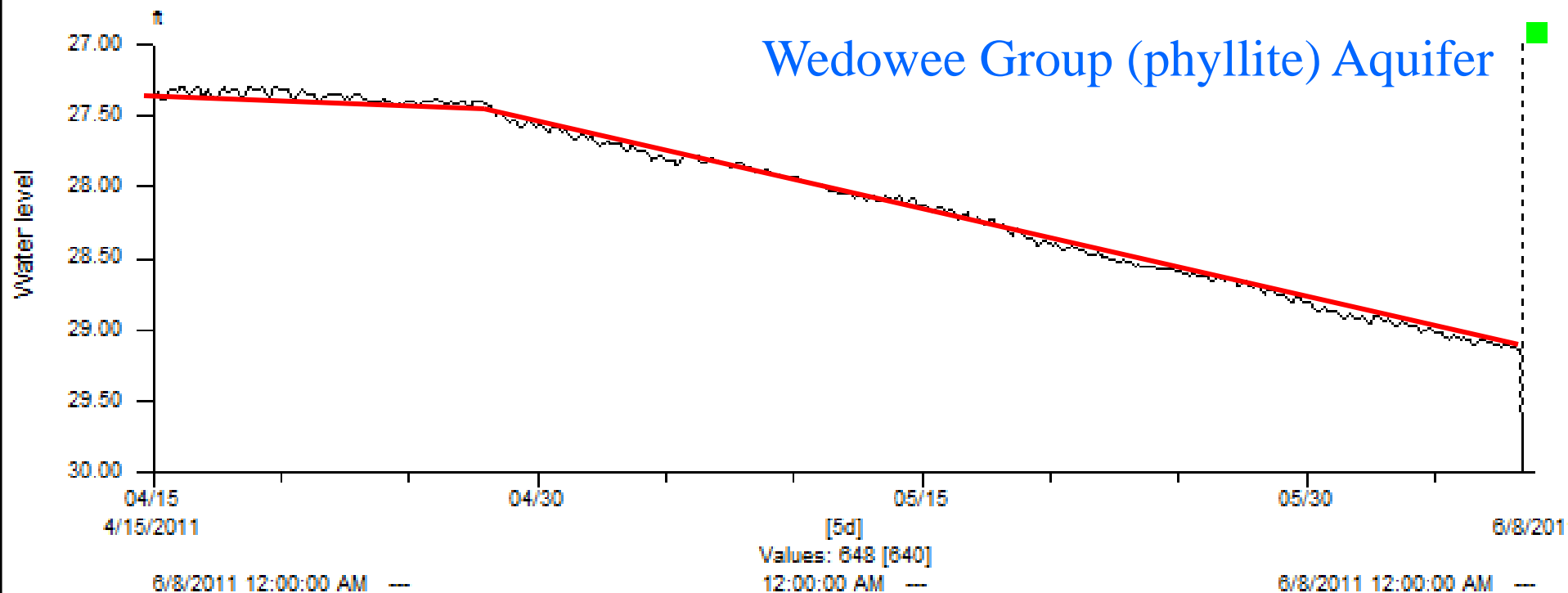


Region: » All Stations «  
Meas. values

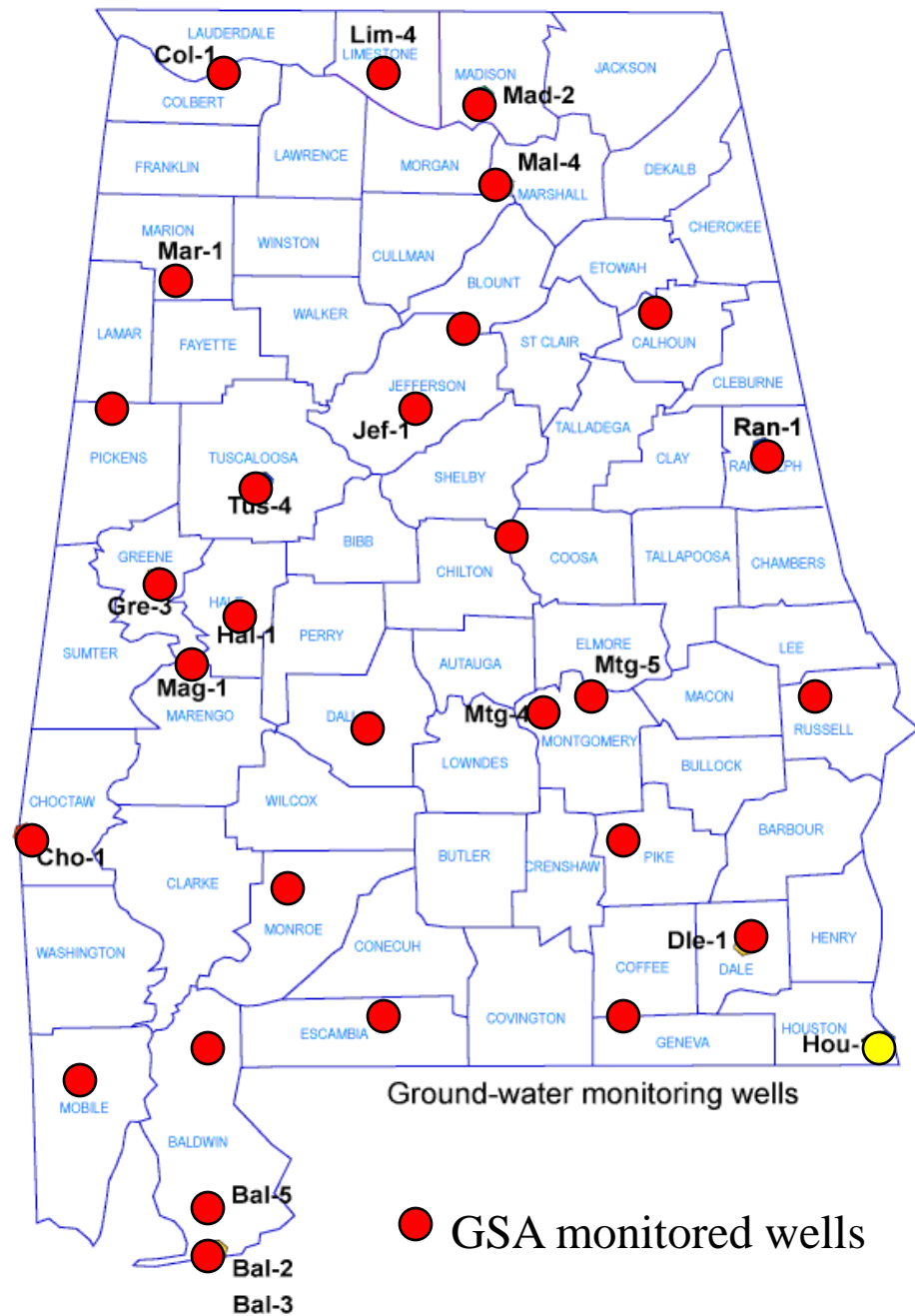
Station:  
Sensor:

RAN 1  
Water level

## Wedowee Group (phyllite) Aquifer



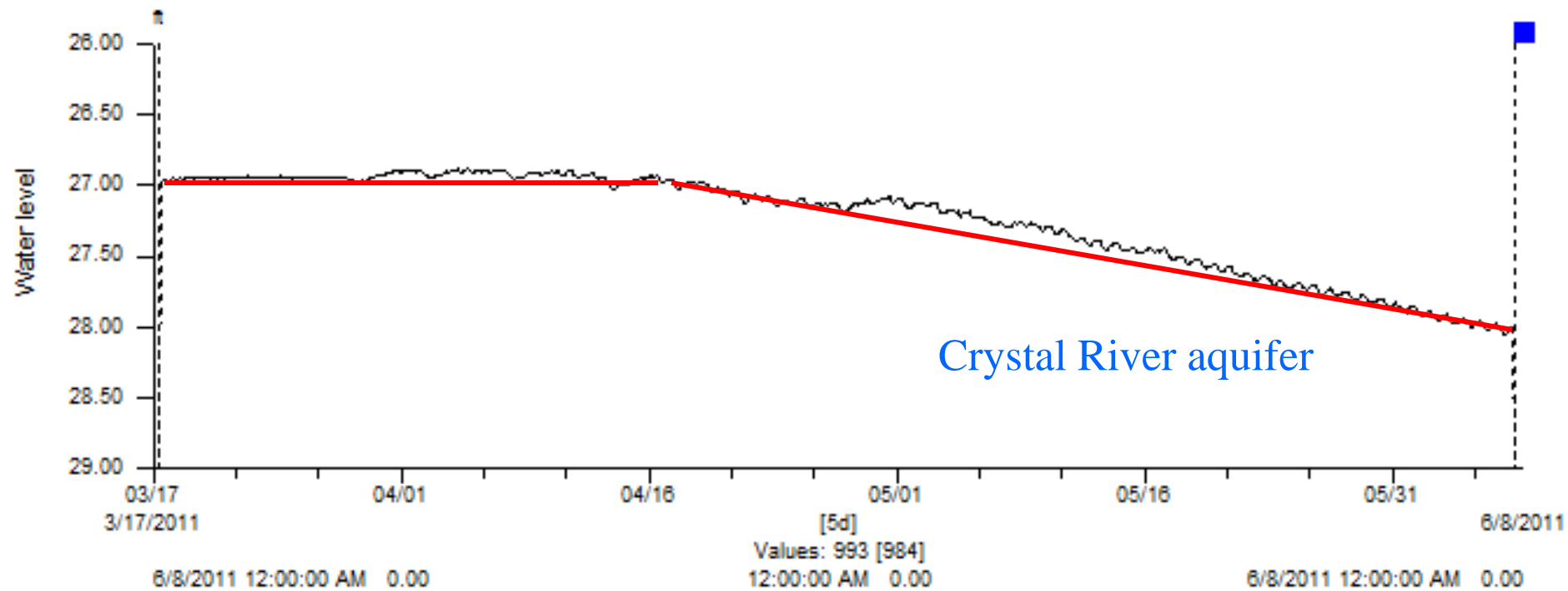
# Houston County

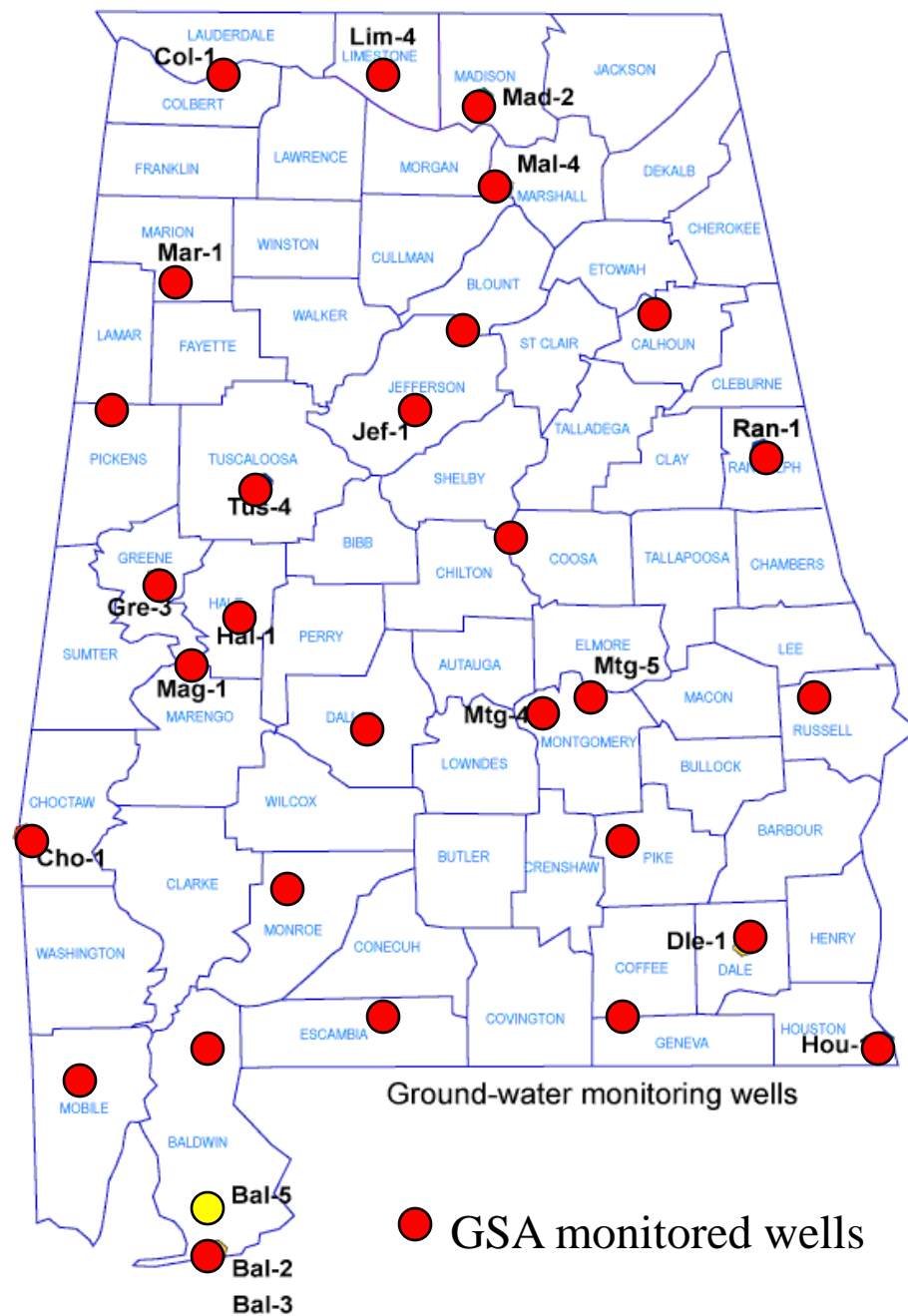


Region: » All Stations «  
Meas. values

Station:  
Sensor:

HOU 1  
Water level

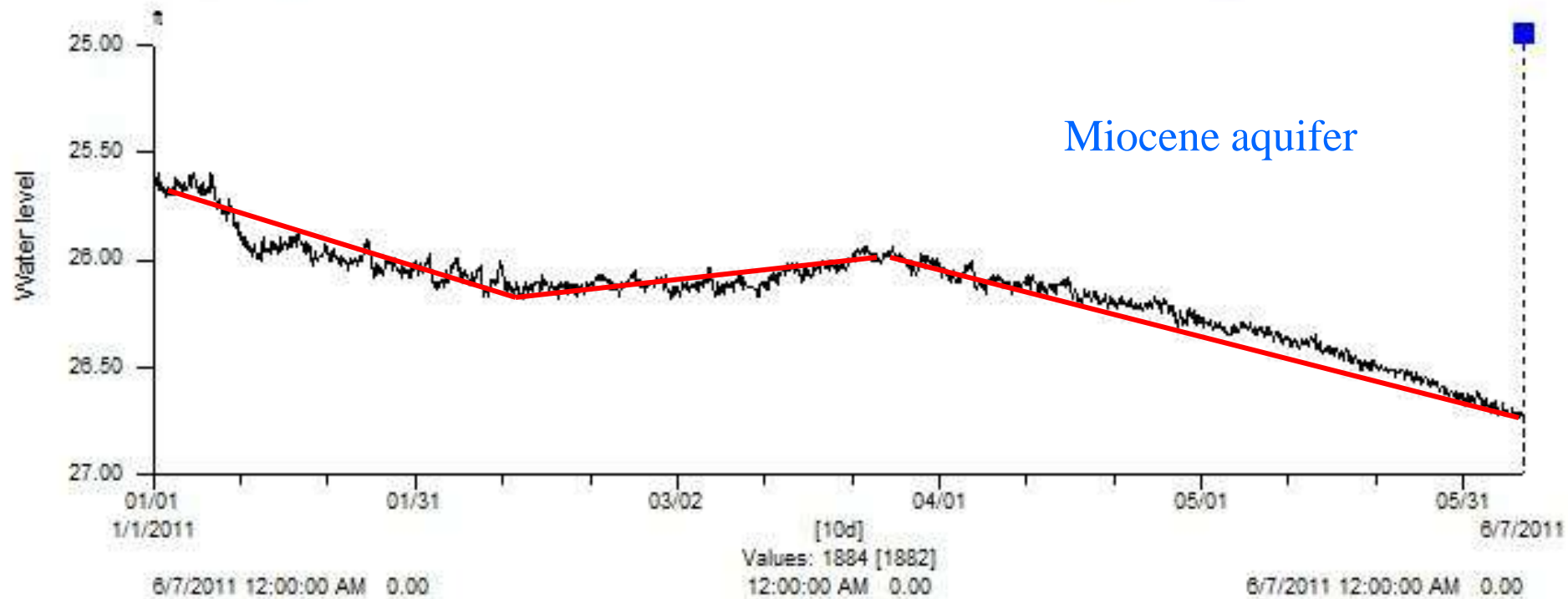




Region: » All Stations «  
Meas. values

Station:  
Sensor:

BAL5  
Water level

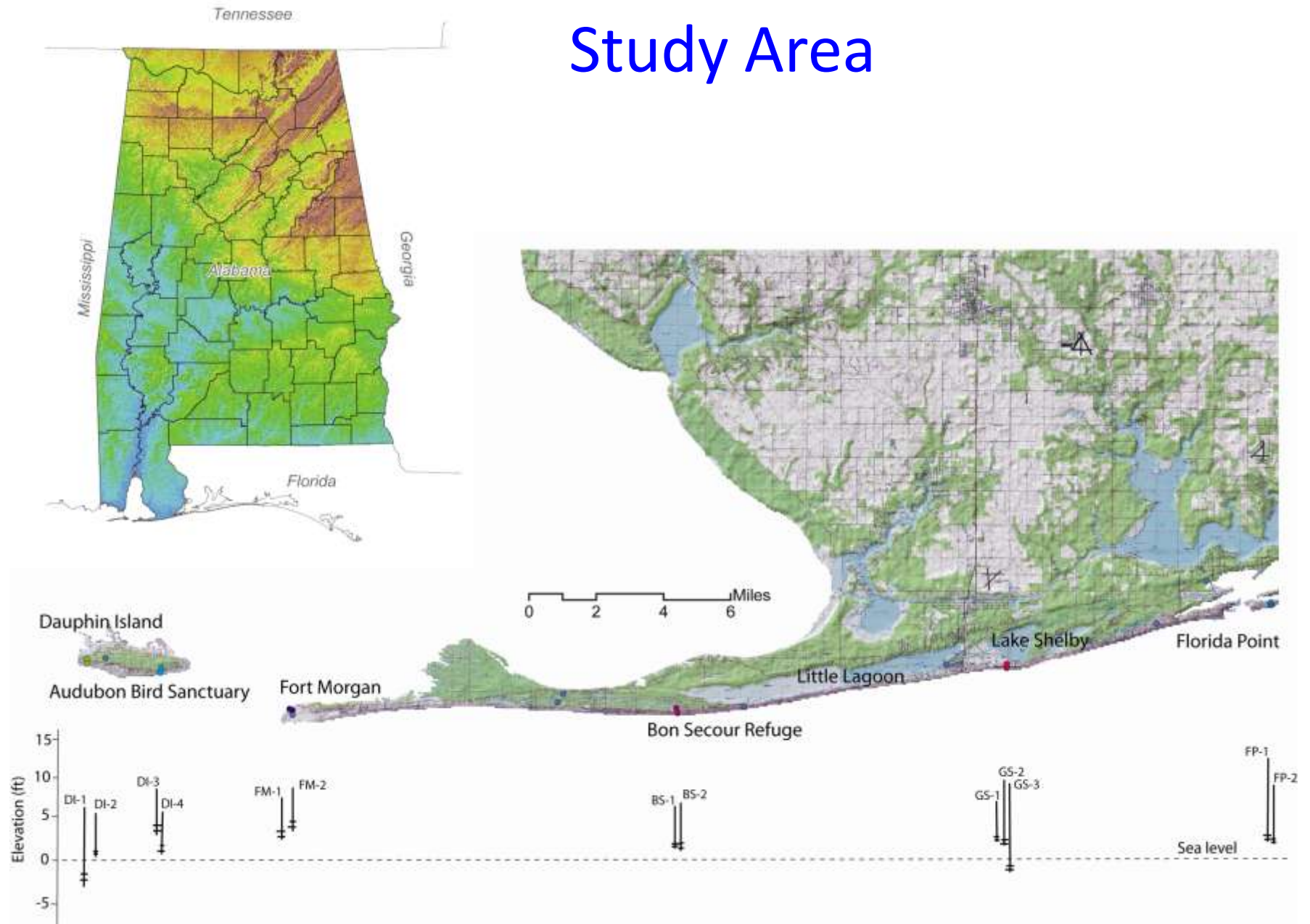


An aerial photograph of a beach scene. In the foreground, the dark blue ocean is heavily polluted with a thick, dark red oil spill that stretches across the water. White foam from breaking waves is visible. In the background, a sandy beach is populated with many people and numerous blue beach umbrellas. The text is overlaid in the center of the image.

# Deepwater Horizon Gulf of Mexico Oil Spill

GSA Response as the  
Alabama Groundwater Trustee

# Study Area









For more information on these or other issues  
related to Alabama water resources contact the  
Groundwater Assessment Program  
at the Geological Survey of Alabama

Marlon Cook 205-247-3692  
On the Web at [www.gsa.state.al.us](http://www.gsa.state.al.us)